

**What is Claimed is:**

1. A method for fabricating a MTJ cell of a MRAM,  
comprising the steps of:

5 forming a pinned ferromagnetic layer on a connection  
layer;

forming a tunnel barrier layer on the pinned  
ferromagnetic layer by depositing a semiconductor film; and

10 forming a free ferromagnetic layer on the tunnel  
barrier layer.

2. The method according to claim 1, wherein the  
semiconductor film consists of a pure Group IV element.

15 3. The method according to claim 1, wherein the  
semiconductor film consists of a Group IV element and  
includes a Group III element or a Group V element as an  
impurity.

20 4. The method according to claim 1, wherein the  
semiconductor film is a compound semiconductor film  
consisting of a Group III element and a Group V element.